

READY, SET, INTEGRATE!

One school used technology mentors to move technology instruction from separate, stand-alone courses to schoolwide integration.

At the American Embassy School (AES) in New Delhi, India, sixth-grade humanities students begin a HyperStudio project on ancient civilizations. The seventh-grade science teacher knows that HyperStudio was introduced in sixth grade and assigns a cooperative HyperStudio project on the igneous, metamorphic, sedimentary rock cycle covered in Earth Science classes. Eighth-grade teachers know that students have built strong HyperStudio skills in sixth and seventh grades, so they assign a multimedia science fiction story containing student-created graphics. This sequence is repeated throughout the curriculum without a specific technology course and using many applications.

How did AES achieve schoolwide technology integration? The process has been one of experimentation, and the outcome evolved from meager beginnings.

Getting Started

The major breakthrough was the development of a new network in spring 1999 with adequate storage capabilities and file server accounts for all students and faculty. At this time, the middle school also adopted a common platform and common software applications. This state-of-the-art equipment allowed those teachers experimenting with a variety of technology use to excel. Use of word processing and content-specific software quickly became common as students typed their essays in Word and used multimedia databases in science and humanities. The teachers in the publications courses were required to use software compatible with the local printers, so their students were using PageMaker regularly. As reliability of the network and

By John McCombs

Subject: Technology integration

Audience: Teachers, library media specialists, technology coordinators

Grade Level: 6–8 (Ages 11–13)

Standards: NETS•S 3; NETS•T II; NETS•A I, IV (www.iste.org/standards)

hardware increased, a few teachers explored student multimedia projects, and a few began to tap into the Internet. This was in fact a wonderful start, but we were not offering equal programs to all students because not all teachers were involving the students in technology-based projects.

Students were learning technology in stand-alone technology courses taught in sixth and seventh grades. In sixth grade, they took an eight-week keyboarding course that included advanced word processing skills, computational and graphing skills, acceptable Internet use, and slide show presentations. Another eight-week cycle was added in 1999 that included a greater focus on multimedia and graphics. (Read more in *L&L*, 29[1], p. 28.) In seventh grade, all students took a digital technology course that built on the sixth-grade topics and added instruction in Logo programming, Web page development, and databases. After these two years of technology education, the students had a strong set of technology skills.

But not all was equal. We began to notice that some teachers were duplicating many of the efforts of the technology courses, and in fact, many of the students were completing redundant lessons. Teachers had a wide range of technology experience and skill. Often they had difficulty finding the training they needed. We found it difficult to offer training because there was a wide gap in technology skills and applications used. As a result, teachers either attended “just in case” training unsuitable for what occurred in their classroom or had no training at all. Thus we had our very own Digital Divide: the teachers interested in technology increased their skills in great leaps, while the “refuseniks” fell further behind in what they could offer their students.

It was time to have a paradigm shift and move the focus from what the teachers wanted to do to what the students needed to learn. And this meant all the students, in all the classrooms.

Issuing the Challenge

Dr. Paul Fochtman, the middle school principal, first broached the idea of schoolwide technology integration in January 2001. He set the stage by asking the department chairs if it were feasible to completely integrate technology in the following school year. The important question was not whether we could eliminate the sixth- and seventh-grade technology classes but whether the skills learned in those classes could be taught by the classroom teachers instead. Integration of technology skills into a particular curricular area required individual knowledge in the content area.

The original planning team was composed of a teacher from each department of the middle school—math, science, humanities, foreign language, fine arts, and English as a Second Language. The team members were required to develop a plan, act as liaisons for their departments, and to serve as mentors for their department during the implementation year. The planning team met with me, as technology coordinator, to develop the plan to carry the school into integration. The planning time was a scant four months so the commitment to success by each mentor was paramount. The mentors were given a \$200 annual stipend to compensate them for the time the project would take. The principal also allowed us valuable release days to develop our

strategies for the integration. Though the \$200 stipend certainly did not average to a very substantial hourly wage, it served as a bonus to reward the volunteerism of the mentors. The two release days were critical to the successful planning and allowed the mentor team time to focus on the project. In the initial discussions, we determined that the following questions needed to be addressed:

- What would be a “best practices” model to follow?
- What would the technology decision-making process be?
- What applications and skills would be taught?
- How much time would be needed to develop the plan, begin an inservice program, and complete projects?
- How would we assess the plan, the teachers, and the students?

As technology coordinator, my role was to locate available resources for the planning team members to discuss and decide on. By having a few alternatives available, it helped focus the discussion and kept it moving forward.

Beginning to Mentor

It was decided that the first step was for the planning team to conduct a survey to gain an understanding of what was occurring currently in the classrooms. After the survey, we were surprised to see how much technology was already being used. We compared what was being taught to the content being taught in the present digital technology class. This process identified those “orphan” applications that needed a special home. The three applications not

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being taught outside of the digital technology class were photo editing, database, and Logo. In addition, some skills (e.g., basic Web page creation) were being taught in only one classroom. Expansion would be required to reach more students.

The mentor team was pleased to find out how much was actually being taught in the classrooms, and this allowed us an opportunity to discuss how the plan would be organized. Different departments adopted the few applications not being taught. For example, the art department agreed to begin teaching Photoshop and image manipulation. We looked at a few models and decided we would organize the Technology Integration Plan (TIP) by software application. We believed teachers were comfortable with referring to software and this categorization would enhance our communication with them. We determined that the plan would need to cover the following items:

- software applied
- skill level required
- time required for the project
- time required to introduce the skills

Because AES has approximately a 10%–15% turnover in teaching staff each year and because of the rapid changes in technology, we needed a document that could easily be amended. A traditional paper document would never have been complete enough to print, and it would have been outdated as soon as it was printed because new components are continually added. We decided a Web-based plan would be perfect. The Web document could have links between topics, get updated regularly, and be available anytime one had online access. I created and maintained the online TIP by

periodically gathering the lesson plans and their accompanying student instruction sheets from the teachers, posting them, and adding links from the TIP Web page. Find the TIP online at <http://aes.ac.in/ms/> in the Administration section under Tech Integration.

Implementing the Plan

The intention of the team was for the plan to contain all the information a teacher needed to integrate technology. As the plan was completed, we created a Web page of each of the components, including lesson plans.

To make the plan manageable to the teachers, we began with the existing projects and skills being taught and then identified the missing skills. The projects that applied the requisite application and included the appropriate skills are linked within the Web-based plan. The actual lesson plan is then available for the class the following year and as an example for other teachers. Also within the plan there could be a skill sheet or tutorial link available to teachers and students that would include the instructions for the technology skills required for the assignment.

The enhancement of teacher skills was a major component in the project. Each department, and therefore each teacher, was responsible for a very specific set of skills. To keep everyone on the same page, we required a mandatory monthly meeting of each department. These “Tech Times” provided a special opportunity to discuss technology and the development of integrated technology projects, and to identify the skills teachers needed to master themselves. The department technology mentors set the agenda of the Tech Time meeting with the intent of providing required training on the topics and upcoming projects during the next

month. Each grade level meets twice a week. To allow teachers to better fit Tech Times into their schedules, the weekly meetings are reduced to one meeting during the week that Tech Time is held.

Mentors determined teacher skill levels by asking the teachers to work on the activities students are expected to do. According to Dr. Fochtman,

The technology mentors provide the necessary seam for true integration to be successful. The mentors, themselves were learners, decision makers, and instructors. As we wrestled with the challenges facing technology integration, our mentors were able to make invaluable contributions.

Even the humanities department, which is the largest department, could focus on specific software that they all use, even though they may use it during different quarters. For example, PowerPoint and HyperStudio are both used throughout the three grade levels and can be targeted.

Assessing Progress

Three areas needed to be assessed to gain the feedback we needed to evaluate and improve the program:

- teacher skill level improvement
- student achievement
- mentor program and TIP delivery

We decided to have teachers assess themselves on a set of skills to minimize their feeling threatened by the challenge of learning technology skills. We used a questionnaire developed by our regional educational organization (North-east South Asia, or NESAs). I constructed the survey and made it available online using a free tool called Profiler. (Read more in *Using Profiler* on p. 57.) To gain insight into the effects of mentor training (and other training) we asked teachers to complete the surveys before and after implementation of the plan, in October 2001 and

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May 2002. Using an online survey also allowed teachers to experience using an interactive Web site, a skill that may be applicable in their classrooms.

One assessment step was to determine whether the TIP was being followed and applied, and if not, why not. Teachers agreed that a checklist survey would be the least intrusive method to assess this. The mentor teachers developed the hard copy checklist from the TIP using the applications teachers were to include and the skills involved. If teachers did not teach a particular skill or application, they had an opportunity to make changes in the TIP for the following year.

A few checklists were piloted with a few teachers and were incorporated into the yearly performance evaluations in the spring. The informal inclusion of technology use in the annual review signaled that the administration valued technology integration and expected teachers to be proactive participants in teaching technology to the students.

The checklists were given to the teachers to evaluate what they are doing and to indicate changes in skills taught, applications used, or timing of the projects. This input gave the teachers influence into the shape of the TIP for their department.

The assessment of the TIP was completed in April and May 2002. The three areas assessed were the:

1. Implementation of the curriculum plan
2. Teachers' technology skills
3. Whether technology skills were actually taught in the classes

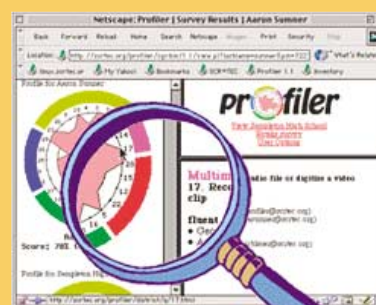
Getting Results

Overall, the results were positive and indicated a program that was acceptable to the teachers, useful for the students, and not offensively intrusive into

teacher autonomy or area curriculum. Improving teacher attitudes toward the technology integration was the greatest benefit of the program. Seventy-two percent of teachers indicated that the TIP had a positive effect on the students. This is certainly a key piece of data, because the equal delivery of technology instruction to students is the main goal of our plan.

Overall, 69% of the respondents had positive feelings about the plan, while 12% were neutral. This left 19% with negative feelings about the plan. This result is to be expected the first year because the technology initiative put a few teachers outside of their comfort zones. We used specific responses to plan the second year of the implementation, the 2002–03 academic year. As this year progresses, teachers are improving their existing projects, adopting others, and focusing on the assessment of technology. Most teachers find that having the projects already created allows them to focus on the assessment of the projects. The Tech Times, though they added to teachers' already busy schedules, were extremely useful in keeping a focus on technology throughout the year. These meetings were critical in keeping the discussion of technology related to departmental needs. Teachers could investigate, discuss, and implement trial projects directly related to their program outcomes. This connection was undoubtedly responsible for teachers' positive feelings toward student achievement in technology. Teachers were optimistic about increasing the assessment of the technology skills as well as increasing the depth of the skills taught.

Teacher Skills. Teachers indicated an 18% increase in their technology skills over the year. Though the results indicated advancement in skill, it became



USING PROFILER

Profiler is a free tool that enables users to create online surveys to assess teachers or administrators on specific skills. Those who take the surveys can keep their answers private, using them for self-assessment only, or they can make them public, even being added to a list of "building experts" in a particular topic area.

One of the key features of Profiler is its ability to track and analyze data. After users complete the survey, they can see their own results in a visual representation (a Profiler image, or badge graph), and they can compare them with the average results from other members of their groups. Administrators of the surveys can download the data for their school or district.

Profiler's other key feature is its directory of experts, which can increase collaboration and peer teaching within your school or district. When users complete the survey and allow their data to be made public, those users who score the highest on a particular question are listed as building experts. Users who need to work on the skill that question assessed can go to these experts in their school or district for help.

Profiler is maintained by the High Plains Regional Technology in Education Consortium, one of 10 such regional consortia funded by the U.S. Department of Education. Find it at <http://profiler.hprtec.org/>.

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apparent to us that either the skills addressed in the survey were too general or the survey questions grouped too many skills together, making the survey too broad in scope. However, the survey covered the skills teachers need to integrate technology.

The Profiler online survey itself is a convenient tool—not only does the site allow users to easily create online surveys, but it also collects the data. We decided to compile the teacher skill results from the strongest to weakest to help prioritize the training we would need to provide teachers. Our strongest skill as a group at the beginning of the school year was using e-mail for daily communications. At the end of the year, the strongest skill was using the school grading program and database. At both times, the weakest skill was communication with parents through a Web page, though we did see an increase as a group of teachers began developing personal or classroom Web pages. Hardware skills (e.g., using digital cameras, video cameras, and scanners) actually doubled over the year, reflecting the increased use of these tools.

Student Skills The survey indicated that more than 80% of the skills and more than 90% of the applications were taught. Because the checklist reflects the actual TIP, the skills not taught were found inappropriate and were taken off the list by the teachers involved with approval of the departments. In some cases, new skills were added. But, everyone involved understands that simply because the teachers delivered the lesson doesn't mean the students learned it.

Each grade-level team discussed possible ways to assess the technology skills. In the fourth quarter, many teachers began to devise assessment pieces for technology for their classes or to add technology components to existing assessments. As the second year of implementation progresses, the plan is

beginning to focus more on the assessment of student achievement, as Rashmi Datta, science department mentor, indicates:

We, in science, have enjoyed the challenge of making sure all the kids are tech savvy by the end of eighth grade. We have highlighted specific skills that departments will be responsible to make sure all kids can do. We are looking at the assessment component to assess if they have these skills.

Summary

The vision to remove a core technology course and integrate technology across curricula was bold. AES was fortunate in that it had many teachers who had already embraced technology, so developing a plan simply meant formalizing and documenting what they were doing. And, by taking the time to assess our progress, we got a good view of what was working and were able to plan for improvements. Because our TIP is Web-based, it is possible to make immediate improvements. Because of all of our hard work, students no longer see technology as a separate course; instead they seamlessly apply technology tools in a wide assortment of meaningful projects.



John McCombs began his journey into technology as a science teacher in the mid 1980s using probes along with spreadsheets, word processing software, and software programs published by MECC. He presented workshops at education conferences in Thailand in 1989 and in Hungary in 1996. He recently left his position as technology coordinator at the American Embassy Schools in India to return with his family to the United States after 20 years of teaching and living internationally. He currently teaches chemistry and physical sciences at The Bolles School in Jacksonville, Florida, and develops course materials and teaches teachers as part of the Educational Certificates of Mastery Program of the Schultz Center for Teaching and Leadership.